Claims

1. (previously presented) In a computer system with a video encoder, a method for regulating level of a buffer for the video encoder, the method comprising:

determining an indicator value associated with a level of a buffer for a video encoder; and

based at least in part upon the indicator value, adjusting median filtering of video information, wherein the median filtering the video information includes median filtering a prediction residual, wherein a kernel defines a neighborhood of values for the median filtering, and wherein the adjusting comprises changing shape of the kernel based at least in part upon the indicator value.

2. (canceled)

3. (previously presented) The method of claim 1 wherein the changing comprises:

if the indicator value is within a first range, selecting a first kernel; and

if the indicator value is within a second range, selecting a second kernel.

4. (previously presented) The method of claim 1 wherein the adjusting further comprises changing a number of times for the median filtering of the video information.

5. (previously presented) The method of claim 1 wherein the determining and the adjusting occur on a frame-by-frame basis.

6. (canceled)

7. (previously presented) The method of claim 1 wherein the median filtering the video information includes median filtering intra-coded pixel data.

8. (original) A computer readable medium storing instructions for causing a computer programmed thereby to perform the method of claim 1.

9. (previously presented) In a video encoder, a bitrate adaptive median filter for video information, the bitrate adaptive median filter comprising:

means for selecting a kernel for median filtering video information, the kernel defining a neighborhood of values for the median filtering, the selecting based upon bitrate of previously compressed video information; and

means for applying the selected kernel to the video information for the median filtering, wherein the means for applying produces filtered video information, and wherein the applying the selected kernel to the video information includes applying the selected kernel to a prediction residual.

10. (original) The bitrate adaptive median filter of claim 9 wherein the filter controls bitrate in conjunction with means for adaptively quantizing the filtered video information and means for adaptively dropping compressed video information for one or more frames.

11. (original) The bitrate adaptive median filter of claim 9 further comprising:

means for buffering the previously compressed video information, wherein the bitrate of the previously compressed video information affects fullness of the means for buffering.

12. (canceled)

13. (previously presented) A computer readable medium storing instructions for causing a computer programmed thereby to perform a method of regulating lossy compression of video information in a video encoder, the method comprising:

during lossy compression of a set of video information, intermittently changing a kernel for filtering the set of video information, wherein the kernel defines a neighborhood of values for the filtering, the kernel selected from plural available kernels including at least a first kernel with a first kernel shape and a second kernel with a second kernel shape different than the first kernel shape, the first kernel for decreasing quality and bitrate, and the second kernel for preserving quality and increasing bitrate; and

using the kernel to filter the set of video information, including filtering a prediction residual.

14. (original) The computer readable medium of claim 13 wherein each of the plural available kernels is a median filter kernel.

15. (previously presented) The computer readable medium of claim 13 wherein the changing is based at least in part upon a quality constraint for the set of video information.

16. (previously presented) The computer readable medium of claim 13 wherein the changing is based at least in part upon a bitrate constraint for the set of video information.

17. (original) The computer readable medium of claim 13 wherein the set of video information includes video information for a video object.

18. (previously presented) A computer readable medium storing instructions for causing a computer programmed thereby to perform a method of controlling bitrate of information in an encoder, the method comprising:

receiving a bitrate indicator for filtering a set of information, the received bitrate indicator indicating a bitrate goal for the set of information, the bitrate indicator based at least in part upon level of a buffer; and

based at least in part upon the received bitrate indicator, adjusting kernel-based filtering of the set of information, wherein a kernel defines a neighborhood of values for the kernel-based filtering, wherein the filtering of the set of information includes filtering a prediction residual, and wherein the adjusting comprises changing shape of the kernel based at least in part upon the received bitrate indicator.

19. (original) The computer readable medium of claim 18 wherein the filtering is median filtering.

20. (canceled)

21. (previously presented) The computer readable medium of claim 18 wherein the adjusting further comprises changing a number of times for the filtering of the information.

22. (canceled)

23. (original) The computer readable medium of claim 18 wherein the set of information is for a video sequence, and wherein the receiving and the adjusting occur for each new set of information for the video sequence.

24. (previously presented) In a computer system, an encoder comprising:

a bitrate adaptive filter for filtering information, wherein a kernel defines a neighborhood of values for the bitrate adaptive filter, wherein the bitrate adaptive filter adjusts filtering by changing shape of the kernel, and wherein the filtering the information includes filtering intra-coded pixel data and prediction residuals;

a frequency transformer for transforming filtered information into the frequency domain;

a quantizer for quantizing frequency transformed information;

an entropy coder for entropy coding quantized information; and

a buffer for buffering entropy coded information, wherein the bitrate adaptive filter adjusts filtering in relation to level of the buffer.

25. (original) The encoder of claim 24 wherein the bitrate adaptive filter is a bitrate adaptive median filter.

26. (original) The encoder of claim 24 wherein the quantizer is a bitrate adaptive quantizer.

27. (original) The encoder of claim 26 wherein the information is for plural frames of a video sequence, and wherein the encoder drops information for one or more of the plural frames when the buffer approaches fullness.

28. (canceled)

29. (canceled)

30. (previously presented) The method of claim 1 wherein the indicator value is based at least in part on a quality measure.

31. (previously presented) The method of claim 30 wherein the quality measure is a perceptual quality measure.

32. (previously presented) The method of claim 1 wherein the median filtering includes:

sorting n input values, wherein n is an odd number greater than 2; and

selecting an output value that is the middle value of the sorted input values.

33. (previously presented) The method of claim 1 wherein the median filtering includes:

sorting n input values, wherein n is an even number greater than 1; and

determining an output value as the unweighted average of the two middle values of the sorted input values.

34. (new) The method of claim 1 wherein the determining an indicator value associated with a level of a buffer comprises determining the indicator value based at least in part upon one or more of percentage of the buffer that is full, numerical deviation from a target level associated with level of the buffer, percentage deviation from a target level of the buffer, percentage of the buffer that is empty, and number of bits used by the buffer.

35. (new) The method of claim 1 wherein the changing shape of the kernel based at least in part upon the indicator value comprises changing shape to one of an L-shaped kernel, a cross-shaped kernel, or a square kernel.

36. (new) The method of claim 35 wherein the kernel is the square kernel when the indicator value indicates that the buffer is full, and is changed successively to the cross-shaped kernel, the L-shaped kernel and no kernel as the indicator value decreases.

37. (new) The method of claim 1 wherein the level of the buffer has plural range values, and wherein each of the plural range values is assigned a kernel shape such that the kernel is changed to the assigned shape when the level of the buffer is within the range value.

38. (new) The method of claim 1 wherein the kernel shapes are chosen from a group consisting of: an L-shaped kernel and a star kernel.

39. (new) The method of claim 1 wherein the changing shape of the kernel based at least in part upon the indicator value comprises changing shape to an L-shaped kernel.